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TITLE: PACKAGE OF RECORDING HEAD UNIT AND PACKAGING METHOD OF
RECORDING HEAD UNIT

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ABSTRACT:

PROBLEM TO BE SOLVED: To carry out an initial introduction of ink into the recording head without generating air bubbles in ink even after being stored for a long period of time by securely preventing storage liquid in the recording head from evaporating.

SOLUTION: An ink jet printer recording head unit 17 with storage liquid put in the interior part of a recording head 18 is such that the nozzle surface side of the recording head 18 is sealed by a nozzle protector 1 in its delivery state, and the ink cartridge mounting side thereof is sealed by a sealing member 40 in order to prevent the leakage of storage liquid from the interior part of the recording head 18 and, in addition, it is housed in an air tight manner by a gas impermeable bag-like sheet material 50. In this structure, storage liquid is prevented from evaporating positively, so that the interior part of the recording head 18 can be avoided from becoming dry even in storage for a long period of time.

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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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CLAIMS

[Claim(s)]

[Claim 1] While having the recording head which records on a recording medium by injecting ink The packing object of the recording head unit characterized by having the sealing member of gas impermeableness which is the packing object which packed up the recording head unit of the ink-jet recording equipment put into the liquid for preservation inside said recording head, and seals and stores said whole recording head unit.

[Claim 2] Said sealing member is the packing object of the recording head unit according to claim 1 characterized by consisting of bag-like sheet material.

[Claim 3] The sheet material of the shape of said bag is the packing object of the recording head unit according to claim 2 characterized by having stored said recording head unit where decompression removal of the internal gas is carried out.

[Claim 4] While having the recording head which records on a recording medium by injecting ink It is used for the recording head unit of the ink-jet recording equipment put into the liquid for preservation inside said recording head. The packing method of the recording head unit which is the packing method for packing up this recording head unit, and is characterized by sealing said whole recording head unit by the sealing member of gas impermeableness.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the packing object of the recording head unit of ink-jet recording equipment, and the packing method of a recording head unit.

[0002]

[Description of the Prior Art] The ink-jet printer is known, for example as ink-jet recording equipment which injects ink to recording media, such as paper, and generally records printing etc. on them. In this ink-jet printer, the recording head which injects ink is included in the recording head unit, and that

recording head unit is carried in the carriage of an ink-jet printer. And the ink cartridge which accommodated ink is prepared in a recording head unit possible [exchange], and ink is supplied to a recording head from the ink cartridge.

[0003] [here] when the above recording head units for ink-jet printers are shipped from a factory In order to make initial introduction of the ink into the recording head in the case of the beginning of using perform smoothly, without generating air bubbles in ink, it is put into the liquid for preservation (henceforth preservation liquid) which has the same characteristic as the ink except dye and the paints of ink inside a recording head.

[0004] As shown, for example in drawing 9 , specifically at the time of shipment In the channel (not shown) which is the inside of the recording head P1, i.e., the ink duct in the jet nozzle P2, and a manifold P3 It fills up with preservation liquid and the nozzle protection member P5 which consists of a seal, rubber or resin etc. which can exfoliate for the purpose, such as leakage prevention of preservation liquid and protection of the nozzle side P4, is further attached to the nozzle side P4 of the jet nozzle P2. Moreover, the ink supply route closure member P7 for closing the ink supply route P6 and preventing leakage of preservation liquid is attached to the ink supply side [to the recording head P1], i.e., wearing of ink cartridge, side.

[0005]

[Problem to be solved by the invention] However, even if it prepares the nozzle protection member P5 and the ink supply route closure member P7 as shown in drawing 9 in a recording head unit When the preservation liquid in the member P5, and the P recording head P1 from few crevices between 7 and a recording head unit evaporates gradually into the atmosphere and the long period of time passed, the inside of the recording head P1 might dry.

[0006] And if the inside of the recording head P1 dries in this way, the effect (that is, effect that initial introduction of the ink into the recording head P1 can be performed without generating air bubbles in ink) by putting in preservation liquid will no longer be acquired fully.

[0007] Since the period kept as stock becomes long easily when this kind of especially recording head unit may be alone shipped to the carriage of an ink-jet printer from a factory as replacement parts etc., without being carried beforehand and it is treated alone in this way, the above-mentioned problem becomes remarkable.

[0008] This invention is made in view of such a problem, and it prevents certainly that the preservation liquid in a recording head evaporates. Also after being continued and kept at a long period of time, it aims at offering the packing object of the recording head unit of ink-jet recording equipment which can perform initial introduction of the ink into a recording head without generating air bubbles in ink, and the packing method of a recording head unit.

[0009]

[The means for solving a technical problem and an effect of the invention] [this invention according to claim 1 made in order to attain the above-mentioned purpose] While having the recording head which records on a recording medium by injecting ink It is the packing object which packed up the recording head unit of the ink-jet recording equipment put into the liquid for preservation (preservation liquid)

inside the recording head, and is characterized by having the sealing member of gas impermeableness which seals and stores the whole recording head unit.

[0010] That is, in this invention, the whole recording head unit is sealed and stored by the sealing member of gas impermeableness. Therefore, according to the packing object of the recording head unit of this invention, it is prevented certainly that the preservation liquid into which it was put inside the recording head evaporates in the atmosphere. For this reason, even if it continues and keeps it at a long period of time, when the inside of a recording head does not dry and it introduces ink into a recording head at the time of the beginning of using of a recording head unit, ink can be introduced smoothly, without generating air bubbles in ink.

[0011] By the way, although the container for which it has fixed form is sufficient as a sealing member of gas impermeableness, it is advantageous, when [according to claim 2] the increase in volume as bag-like sheet material, then a product of a recording head unit and the increase in weight can be controlled for a sealing member and it is storage and shipment like.

[0012] Moreover, a bigger effect can be acquired, if the sheet material of the shape of the bag stores a recording head unit like where [according to claim 3] decompression removal of the internal gas is carried out in using bag-like sheet material as a sealing member like the above.

[0013] That is, it is because space of the sheet material of the shape of a bag as a sealing member and a recording head unit can be made very small, so the amount of evaporation of the preservation liquid into which it was put inside the recording head can be stopped to the minimum. Next, [this invention] while this invention according to claim 4 is equipped with the recording head which records on a recording medium by injecting ink It is the packing method for being used for the recording head unit of the ink-jet recording equipment put into the liquid for preservation inside the recording head, and packing up the recording head unit, and is characterized by sealing the whole recording head unit by the sealing member of gas impermeableness.

[0014] And by this packing method, the packing object of a recording head unit according to claim 1 can be acquired, and the effect mentioned above can be acquired. That is, according to the packing method of this invention, since sealing storage of the whole recording head unit is carried out by the sealing member of gas impermeableness, it is prevented certainly that the preservation liquid into which it was put inside the recording head evaporates in the atmosphere. For this reason, even if it continues and keeps a recording head unit at a long period of time, the inside of a recording head cannot dry but initial introduction of the ink at the time of the beginning of using can be performed smoothly.

[0015]

[Mode for carrying out the invention] The recording head unit of the embodiment to which this invention was applied is hereafter explained using Drawings. Drawing 1 is the perspective view showing the recording head unit 17 of this embodiment first.

[0016] [the unit] although the recording head unit 17 shown in drawing 1 may be shipped from a factory in the state where it is used being attached to the carriage (illustration abbreviation) of an ink-jet printer, and was attached to the above-mentioned carriage By this embodiment, it is premised in

particular on the case where it is alone shipped from a factory without being attached to the above-mentioned carriage.

[0017] Here, the recording head 18 for recording printing etc. is formed in the front part (right-hand side of drawing 1) of the recording head unit 17. And the recording head unit 17 concerned is the thing of the ink-jet type which breathes out a liquid ink drop and performs record operation on the archival paper which is a recording medium about the ink (Cyanogen c, Magenta m, Yellow y, black b) of two or more colors (four colors).

[0018] For this reason, in order to inject the ink of each color respectively, the jet nozzle [two or more (four)] 21y, 21m, 21c, and 21b (it is named 21 generically) are prepared in the above-mentioned recording head 18, and the injection hole [a large number (for example, 64 pieces)] 24 is carrying out the opening to it in the nozzle side 23 of each jet nozzle 21. And as the two-dot chain line of drawing 1 shows, at the time of use, the rear (left-hand side of drawing 1) of the recording head unit 17 concerned is equipped with four ink cartridges 22y which supply the ink of each color to each jet nozzle 21, 22m, 22c, and 22b (it is named 22 generically) removable.

[0019] Next, at the time of shipment of the recording head unit 17, the nozzle protector 1 with which the injection side (that is, the recording head 18 side) of the recording head unit 17 is equipped is explained based on drawing 2 and drawing 3 in order to protect the nozzle side 23 of each jet nozzle 21. In addition, this nozzle protector 1 is removed at the time of use of the recording head unit 17.

[0020] As shown in drawing 2 , the main part is the abbreviation horseshoe-shaped member which consists of a hard plastic, and the nozzle protector 1 consists of the tabular pedestal 2, the 1st arm 3 set up by one end of this pedestal 2, and the 2nd arm 4 set up by the other end of the pedestal 2. And the cap 6 of a two or more (a total of four pieces) for covering each nozzle side 23 airtightly in the position corresponding to the nozzle side 23 of each jet nozzle 21 is respectively stuck on the internal surface of a pedestal 2.

[0021] Moreover, as shown in drawing 2 , the 1st crevice 7 (refer to drawing 1) prepared in the side of the recording head unit 17 and the 1st convex part 8 to stop are formed in the inner side by the side of the tip of the 1st arm 3. On the other hand, said 1st convex part 8, the 2nd crevice (not shown) similarly prepared in the side of another side of the recording head unit 17, and the 2nd convex part 11 to stop are formed also in the inner side by the side of the tip of the 2nd arm 4.

[0022] In addition, the tip side of the 1st arm 3 is constituted as a fingerplate part 9 bent outside. Moreover, caps 6 are products made from elastic material (for example, butyl rubber), such as rubber, and as shown in drawing 3 , they consist of the height 6b, for example, the 0.8mm rib, set up from the covering device 6a and this covering device 6a. And Rib 6b is formed annularly [a quadrangle] so that the perimeter of all the injection holes 24 of each nozzle side 23 may be surrounded.

[0023] Next, the internal structure of the recording head unit 17 and the state at the time of the shipment are explained. As first shown in drawing 4 R> 4, each jet nozzle 21 prepared in the recording head 18 is the actuator of the common knowledge which deleted the material which is a piezo-electric element and was formed, and the passage of the ink called many channels 41 is formed in the inside. And the end by the side of the nozzle side 23 of the channel 41 (end of the left-hand

side in drawing 4 R> 4) is the injection hole 24 of ink.

[0024] Moreover, that ink inflow side (right-hand side of drawing 4) is opening all the channels 41 for free passage to the manifold 42 prepared in the inside of the recording head 18, and the filter 43 for removing garbage etc. is formed in the ink inflow side of this manifold 42. In addition, the manifold 42 is respectively formed corresponding to each jet nozzle 21.

[0025] and [the edge of the outside of the above-mentioned filter 43] The terminal area material 44 made from elastic material, such as rubber used for connection of an ink cartridge 22 or the closure member 40 mentioned later, is formed, and in the center of the terminal area material 44 The ink supply route 48 for supplying ink to a manifold 42 from the ink cartridge 22 carried in the recording head unit 17 concerned is formed.

[0026] Therefore, at the time of use of the recording head unit 17 concerned, ink is supplied to a manifold 42 via the ink supply route 48 from an ink cartridge 22, and ink is further supplied to all the channels 41 from the manifold 42. And when voltage is impressed to the jet nozzle 21 and the passage width of a channel 41 changes, ink is injected from the injection hole 24.

[0027] Here, at the time of shipment of the recording head unit 17, it fills up with preservation liquid in the inside 41 of the recording head 18, i.e., the channel of each jet nozzle 21, and a manifold 42. And it is equipped with the nozzle protector 1 mentioned above, and the injection side is closed with cap 6, and the wearing side (right-hand side of drawing 4) of an ink cartridge 22 is closed by the closure member 40.

[0028] In addition, it is equipped with the closure member 40 removable to the recording head unit 17, and it closes each of the ink supply route 48 corresponding to each jet nozzle 21 at once. And at the time of use of the recording head unit 17, this closure member 40 is removed, instead it is equipped with the ink cartridge 22 corresponding to each color.

[0029] [the state where it filled up with preservation liquid in the channel 41 of each jet nozzle 21, and the manifold 42] by this While the nozzle side 23 of each jet nozzle 21 is airtightly covered with each cap 6 of the nozzle protector 1, it is prevented that the ink supply route 48 corresponding to each jet nozzle 21 is closed by the closure member 40, and preservation liquid leaks out from the inside of the recording head 18.

[0030] Here, although the state where the recording head unit 17 was equipped with the nozzle protector 1 and the closure member 40 is shown in each figure of drawing 5 and drawing 6 , the nozzle protector 1 is fixed as both the arm 3 and 4 sandwich the side of the recording head unit 17. That is, when both the arms 3 mentioned above, the 1st and 2nd convex part 8 of 4, and 11 engage with each crevice 7 prepared in the side of the recording head unit 17, the nozzle protector 1 is fixed to the recording head unit 17.

[0031] Thus, the recording head unit 17 is in the state where the inside of the recording head 18 was filled up with preservation liquid, at the time of the shipment, and while the injection side (recording head 18 side) is closed with the cap 6 of the nozzle protector 1, the wearing side of an ink cartridge 22 is closed by the closure member 40.

[0032] and when using it, attaching the recording head unit 17 concerned to the carriage of an ink-jet

printer [with the suction unit which replaces with the closure member 40, equips with the ink cartridge 22 of each color, and consists of a suction cap, a suction pump, etc. of the common knowledge with which the ink-jet printer was equipped further] while removing the nozzle protector 1 Ink is attracted from the nozzle side 23 side of each jet nozzle 21, ink is introduced the first stage in the recording head 18 (in detail inside of the channel 41 of the jet nozzle 21, and a manifold 42), and printing etc. is started after that.

[0033] [here] when performing initial introduction (what is called an initial purge) of ink using a suction unit as mentioned above Ink can be introduced into the inside of the recording head 18, without generating air bubbles in ink, since preservation liquid is contained in the channel 41 and manifold 42 of each jet nozzle 21.

[0034] However, it sets in the state before starting use of the recording head unit 17. manufacture variations, such as the nozzle protector 1 and the closure member 40, or a small crack -- between the recording head unit 17 and the caps 6 of the nozzle protector 1 -- or Between the recording head unit 17 and the closure member 40, few crevices may be made and the preservation liquid in the recording head 18 may evaporate in the atmosphere from the crevice. And in this case, if a long period of time passes, the inside of the recording head 18 will dry. The above-mentioned effect (that is, effect that initial introduction of the ink into the recording head 18 can be performed without generating air bubbles in ink) by putting in preservation liquid is no longer acquired fully.

[0035] So [especially], in this embodiment at the time of shipment of the recording head unit 17 The recording head unit 17 in the state where the inside of the recording head 18 was filled up with preservation liquid as mentioned above, and it was equipped with the nozzle protector 1 and the closure member 40 As shown in drawing 7 , it is made to carry out sealing storage of (the thing of this state is hereafter called recording head unit 17) by the sheet material 50 of the shape of a bag as a sealing member of gas impermeableness. In addition, drawing 7 shows the state at the time of shipment of the recording head unit 17, (a) is the top view, and (b) is the figure which fractured the sheet material 50 and expressed the left lateral.

[0036] When packing up the recording head unit 17 with a factory, specifically, the following packing methods are taken. First, as shown in drawing 8 , put the recording head unit 17 into the sheet material 50 of the shape of a bag in which a plane is a quadrangle and one of four side edges carried out the opening, and subsequently He carries out decompression removal of the internal air, and is trying to blockade the above-mentioned opening 50a with techniques, such as heat welding, finally from the opening 50a of the bag-like sheet material 50. And in this embodiment, the laminated material of the polyethylene which does not make gas penetrate is used as sheet material 50.

[0037] For this reason, according to the packing object of the recording head unit 17 shown in drawing 7 of this embodiment, it is prevented certainly that the preservation liquid into which it was put inside the recording head 18 evaporates in the atmosphere. Therefore, even if it continues and keeps it at a long period of time, when the inside of the recording head 18 does not dry and it introduces ink into the recording head 18 at the time of the beginning of using of the recording head unit 17, ink can be introduced smoothly, without generating air bubbles in ink.

[0038] Moreover, like this embodiment, if the bag-like sheet material 50 is used, the increase in volume as a product of the recording head unit 17 and the increase in weight can be controlled, and when it is storage and shipment, it is advantageous, although a fixed-shaped container is sufficient as a sealing member of gas impermeableness.

[0039] And when carrying out [this embodiment] sealing storage of the recording head unit 17 by the bag-like sheet material 50, after carrying out decompression removal of the air inside the bag-like sheet material 50, blockade and the opening 50a [with this] The bag-like sheet material 50 is changing into the state where the recording head unit 17 was stored where decompression removal of the internal gas is carried out.

[0040] For this reason, as shown in drawing 7 (b), space between the sheet material 50 and the recording head unit 17 can be made very small, and the amount of evaporation of the preservation liquid into which it was put inside the recording head 18 can be stopped to the minimum. In addition, as long as this invention is not limited to the above-mentioned embodiment and belongs to the technical range of this invention, it cannot be overemphasized that various forms can be taken.

[0041] For example, in the above-mentioned embodiment, although the laminated material of polyethylene was used as sheet material 50, as the material, a polyvinylidene chloride, polypropylene, nylon, prevention-of-moisture cellophane, VCM/PVC, etc. may use other things of gas impermeableness. Moreover, as sheet material 50, you may use not a laminated material but the monolayer material of the above-mentioned material (polyethylene, a polyvinylidene chloride, etc.). Furthermore, as sheet material 50, what vapor-deposited metal, such as aluminum, and the thing which sandwiched metallic foil, such as aluminum foil, with resin material can be used for the above-mentioned material.

[0042] [in the recording head unit 17 of the above-mentioned embodiment, where the inside of the recording head 18 is filled up with preservation liquid, equipped with the nozzle protector 1 and the closure member 40, but] on the other hand It is once filled up with preservation liquid in the recording head 18, suction removal of the preservation liquid is carried out after that, it changes into the state where the inner skin of a channel 41 and a manifold 42 was soaked in preservation liquid, and you may make it equip with the nozzle protector 1 and the closure member 40 in the state.

[0043] And even if it does in this way, evaporation of preservation liquid is certainly prevented by the bag-like sheet material 50, and, moreover, there is also no fear of preservation liquid leaking from the inside of the recording head 18. On the other hand, further, by the above-mentioned embodiment, although the ink-jet printer was explained, this invention is applicable to various kinds of ink-jet recording equipments, such as the other facsimile machine.

[Translation done.]